CLAIMS

1. A method of processing oscillatory response data from a resonant system comprising:

obtaining data measuring an oscillatory response of the system;

estimating the variation in natural frequency of a mode of said response;

filtering the data around a selected frequency to obtain a filtered response;

determining a carrier signal whose frequency variation with respect to time is equal in magnitude to said estimated variation in natural frequency; and

modulating the amplitude of said carrier signal using said filtered response to obtain a modulated carrier signal.

2. A method according to claim 1 wherein the frequency of the carrier signal is greater than the difference between the highest and lowest values of the natural frequency of said mode over the period of interest.

3. A method according to claim 1 or claim 2 wherein said step of estimating the change in natural frequency includes calculating a running average of the instantaneous frequency of the response.

4. A method according to claim 1 or claim 2 wherein said step of estimating the change in natural frequency includes obtaining time averaged Fourier transforms of the measured data.

5. A method according to any one of the preceding claims wherein the selected frequency is the natural frequency of the mode in said step of estimating.

6. A method according to any one of claims 1 to 4 wherein the selected frequency is an engine order frequency.

7. A method of analysing a resonant system comprising:

performing the method of any one of the preceding claims; and

analysing the modulated carrier signal to determine a characteristic of the system.

8. A method according to claim 7 wherein the step of analysing includes determining characteristics relating to the bandwidth of the mode.

9. A method according to claim 7 or claim 8 wherein the step of analysing includes determining a power spectral density function.

10. A method according to any one of the preceding claims wherein the system is a model system.

11. A method according to any one of claims 1 to 9 wherein the system is a mechanical system.

12. A method according to claim 11 wherein the system is a gas turbine engine or a component thereof.

13. An apparatus for processing oscillatory response data from a resonant system, the apparatus including:

a processor which is adapted to:

receive measurement data relating to an oscillatory response;

estimate from the data the variation in natural frequency of a mode of said response;

filter the data around a selected frequency to obtain a filtered response;

determine a carrier signal whose frequency variation with respect to time is equal in magnitude to said estimated change in natural frequency; and

modulate the amplitude of said carrier signal using said filtered data.

14. An apparatus according to claim 13 further including a sensor for measuring an oscillatory response of the system, wherein said processor is adapted to receive said measurement data from the sensor.

15. An apparatus according to claim 14 wherein the oscillatory system is a mechanical system.

16. An apparatus according to claim 15 wherein the mechanical system is a gas turbine engine or a component thereof.

17. An apparatus according to claim 13 wherein the system is a model system, and the processor is part of a computer.

18. An apparatus according to any one of claims 13 to 17 wherein the frequency of the carrier signal is greater than the difference between the highest and lowest values of the natural frequency of said mode over the period of interest.

19. A method of processing oscillatory response data substantially as herein described.

20. A apparatus for processing oscillatory response data substantially as herein described.